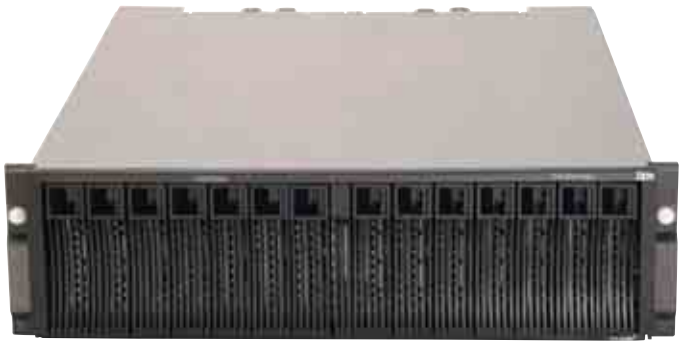
A cost-effective, modular architecture to support e-business on demand environments to grow as demands grow

IBM TotalStorage DS4300 Express Model



IBM TotalStorage DS4300 Express Model

Highlights

- ***Offers optimized configurations priced attractively for small to medium-sized businesses***
- ***Provides flexible upgrades and scalable options to facilitate growth with minimal business disruption***
- ***Includes IBM TotalStorage® DS4000 Storage Manager to help centrally manage the DS4000 series to enhance scalability, supporting performance and capacity requirements***
- ***Designed to help facilitate storage consolidation in storage area network (SAN), network attached storage (NAS) and direct-attach environments***
- ***Designed to deliver high performance and productivity, up to 768 MBps throughput with turbo option[1]***

Wide range of storage consolidation and clustering applications

The IBM TotalStorage DS4300 Express is designed to be an affordable, scalable storage server for storage consolidation and clustering applications. Its modular architecture—which includes Dynamic Capacity Addition, Dynamic Volume Expansion and a turbo option—can support e-business on demand™ environments by helping to enable storage to grow as demands increase. Autonomic features such as online firmware upgrades and DS4000 Service Alert also help enhance the system's usability.

The DS4000 EXP710 Express switched disk expansion unit has an ESM-embedded Fibre Channel "loop switch." The loop switch creates what is essentially point-to-point Fibre Channel communication, allowing the ESMs and

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drives to operate as though they were on a private Fibre Channel arbitrated loop, but with the performance and diagnostic advantages of Fibre Channel fabric. A great advantage of the DS4000 EXP710 Express is a significant reduction in the number of Fibre Channel nodes on the drive loops.

The DS4300 Express single controller offers up to 4.2TB of Fibre Channel (FC) physical disk storage. The DS4300 Express dual controller offers up to 16.8TB of FC physical disk storage capacity with the attachment of three DS4000 EXP710 Express models. The DS4300 Express Turbo offers up to 33.6TB of fibre channel physical disk storage capacity with the attachment of seven DS4000 EXP710 Express models. Both the DS4300 Express and DS4300 Express Turbo offer up to 28TB of Serial ATA physical disk storage capacity with the attachment of eight DS4000 EXP100 Express models.

This server is designed to help consolidate direct-attached storage into a centrally managed, shared or storage area network (SAN) environment using fibre channel disk drives and the DS4000 EXP710 that attaches to the DS4300 Express, and the DS4000 EXP710 Express with the DS4300 Express with Turbo feature. With built-in support for four Fibre Channel-attached servers, the need for additional switches is reduced or eliminated, helping to make server clustering more cost effective. The DS4300 Express single controller offers 4.2TB of fibre channel physical disk storage for entry-level solutions.

The DS4300 Express is well-suited for cost-conscious workgroup SANs as well as small businesses and data centers. Designed for open systems environments, this storage system helps provide heterogeneous platform support by including failover drivers for the Microsoft® Windows® 2000, Windows Server™ 2003, Windows 2000 Server

Not too big. Not too small. Designed for mid-sized business, the IBM Express Portfolio of offerings is just right. Each and every offering that's part of the IBM Express Portfolio is certified to ensure three simple features:

1. Easy to install and deploy

2. Easy to manage

3. Competitively priced

The IBM Express Portfolio of offerings are scalable and have the features and functionality you'll need to meet your technology needs, including hardware, software, services and financing. Since they are priced just right for mid-sized businesses, you know you'll get more out of your investment.

and Windows 2000 Advance Server operating system and optional support for AIX® (except single controller), Sun Solaris, HP-UX, Novell NetWare and Linux® operating systems. The DS4300 Express is designed to interoperate with IBM @server® pSeries® and xSeries® servers as well as with Intel® processor-based and UNIX® operating system-based servers. To help make integration easy, IBM tests the DS4300 Express for interoperability with IBM servers, as well as with many other brands of servers and switches.

Part of the DS4000 series

The DS4300 Express is part of the DS4000 series, which uses common storage management software and expansion enclosures. Dual controller models are designed to be compatible with existing DS4000 EXP710 Express disk enclosures and include many of the same high-performance software and redundant hardware design features as other DS4000 series systems.

The DS4300 Express dual controller models can also be used with the DS4000 EXP100 Express Serial ATA disk drive storage unit. This helps address the requirements of various fixed content and data reference applications which require large amounts of storage capacity but do not have the high utilization and access characteristics satisfied by DS4000 EXP710 Express Fibre Channel disk drive storage.

Scalability throughout the series

Because the DS4300 Express is highly scalable, up to 112 fibre channel with turbo option or 112 Serial ATA disk drives, it can be upgraded from a workgroup SAN to an enterprise network storage system, thereby providing flexibility to grow with your business. In addition, by using the IBM TotalStorage DS4000 Storage Manager software, multiple DS4300 Express models can be combined to help address additional performance and capacity requirements—further enhancing your scalability options.

Another scalability feature of the DS4300 Express is Dynamic Capacity Expansion (DCE), which is designed to provide the ability to add DS4000 EXP710 Express or DS4000 EXP100 Express enclosures to an existing DS4300 Express dual controller model or DS4000 EXP710 Express, or EXP100 Express to a DS4300 Express with Turbo feature without stopping operations. By adding these enclosures, the DS4300 Express can help bring unused storage online for a new host group or an existing volume to provide additional capacity on demand.

It is designed to allow upgrades to higher performing DS4000 series systems while keeping data intact, helping to minimize disruptions during upgrades. The DS4300 Express also supports online controller firmware upgrades, to help provide better performance and functionality. Events such as upgrades to support the latest version of DS4000 Storage Manager or to add services such as DS4000 Service Alert, or the new DS4000 Alert Manager, can generally be executed without stopping operations.

High-performance design further enhanced by turbo option

To meet growing needs for storage capacity and performance, the DS4300 Express may be upgraded with the turbo option, which includes DS4000 Storage Manager version 9.10 (the base dual controller model includes version 9.10, version 9.10 for single controller). The turbo option helps extend the high-availability and scalability characteristics of the entry-level DS4300 Express base model, and may be added during the initial order or later as an upgrade. Both the base model and turbo option are designed to offer high-performance, low-cost storage and the flexibility to grow with your business.

The DS4300 Express uses advanced caching algorithms to help optimize disk performance. The base dual controller model is designed to deliver up to 77,500 cached I/Os per second and up to 400 MBps throughput in streaming disk reads. Using DS4000 Storage Manager 9.10, the DS4300 Turbo is designed to perform up to 77,500 cached I/Os—and provides up to 768 MBps throughput.

The DS4300 Express with "fibre channel" dual controller without Turbo can support up to 56 disk drives when using three DS4000 EXP710 Express disk enclosures or 112 SATA disk drives when using eight EXP100 Express Expansion Units. With the turbo option, it can support up to 112 drives when using seven DS4000 EXP710 Express disk enclosures. The base dual controller model offers up to 16.8TB of Fibre Channel and up to 16 storage partitions. By adding the turbo option, the DS4300 Express can support up to 33.6TB of fibre channel and up to 64 storage partitions. The DS4300 Express dual controller and DS4300 Express Turbo offer up to 28TB of Serial ATA physical disk storage capacity with the DS4000 EXP100 Express.

Other features of the turbo option include an increased cache size of 2GB and an auto-sensing capability to help detect host connectivity speed. This auto-sensing capability adds support for 1 Gbps Fibre Channel connectivity to the base model's 2 Gbps Fibre Channel interface, allowing the DS4300 Express to support a wider range of devices and thus is designed to provide greater interoperability. The turbo option also helps extend the copy services capabilities of the DS4300 Express by including the VolumeCopy feature, which is designed to enable full replication of logical volumes for enhanced data management and protection. Also available is version 9.1 with turbo option supporting Enhanced Remote Mirroring for replication of logical volumes.

DS4000 Intermix feature for attachment of Fibre Channel and Serial ATA Disk Storage Expansion units

The IBM TotalStorage DS4500, DS4400 and DS4300 Turbo Midrange Disk Systems have the capability to support attachment of both DS4000 EXP710 Express Fibre Channel Disk Expansion units and DS4000 EXP100 Express Serial ATA Disk Expansion units concurrently. This feature requires the DS4500, DS4400, or DS4300 Turbo systems be upgraded to the DS4000 Storage

Manager firmware (06.10 or later) and host-based code (SM V9.10 or later). With this feature, you can create and manage distinct array groups that are built from either FC disks or SATA disks and allocate logical drives to the appropriate applications utilizing a single DS4000 system. Those applications that demand high performance and have high I/O rates could use the FC-based drives, while near-line, or applications that do not demand the higher performance can be maintained on the SATA based-drives.

Centralized administration through DS4000 Storage Manager

The TotalStorage DS4000 Storage Manager software included with the DS4300 Express is designed to support centralized management of all local and networked DS4000 series systems. DS4000 Storage Manager allows administrators to quickly configure and monitor storage from a Java™ technology-based Web browser interface. It is also designed to allow them to customize and change settings as well as configure new volumes, define mappings, handle routine maintenance and dynamically add new enclosures and capacity to existing volumes—without interrupting user access to data. Failover drivers, performance-tuning routines and cluster support are also standard features of the DS4000 Storage Manager.

By providing these features and an intuitive user interface, the DS4000 Storage Manager is designed to help reduce the complexity of storage management and the amount of time spent managing storage.

The turbo option includes DS4000 Storage Manager Version 9.12, which is designed to support up to 256 logical volumes per storage partition, array groups up to 2TB and the SCSI-3 Persistent Reservation facility for enhanced server clustering applications. These additional capabilities help the DS4300 Express to support larger storage environments.

Enhanced storage management capabilities

The IBM TotalStorage DS4300 Express has several features designed to improve data management and storage system performance. Using the DS4000 Storage Manager software, administrators can partition the DS4300 Express into as many as 16 virtual servers; with the turbo option, they can create up to 64 partitions. This capability allows IT organizations to strategically allocate storage capacity, helping to optimize the utilization of storage space and help reduce hardware and storage management costs. Instead of purchasing multiple RAID controllers with their own dedicated disks and management, organizations can attach multiple servers to one central system—the DS4300 Express—which is designed to provide hardware failover with dual controllers and common management.

Other DS4300 Express features that can help enhance data management and protection include FlashCopy®, Dynamic Volume Expansion, VolumeCopy and Enhanced Remote Mirroring.

- *The IBM FlashCopy feature is designed to take instant point-in-time copies of logical volumes, which may be used for file restoration, backups, application testing or data mining*
- *Dynamic Volume Expansion is designed to allow administrators to resize logical volumes without disrupting users. This feature can work well for applications with rapidly growing data requirements, such as Lotus Notes® and Microsoft Exchange*
- *Available only with the turbo option, the VolumeCopy feature is designed to provide full replication of one logical volume (source) to another (target) within the DS4300 Express. VolumeCopy is designed to allow read-only access to the source volume during the copy process, and suspend writes to support point-in-time integrity*
- *Supported with V9.1 is Enhanced Remote Mirror. It consists of Global Mirror with Asynchronous Write-order Consistency, which is critical for mirroring multi-LUN applications, Global Copy with Asynchronous and Metro Mirror with Synchronous*

Multiple DS4300 Express models can use a common pool of hot-spare disk drives as a cost-effective way of improving availability, even if the DS4300 Express models are attached to different servers. IT administrators can determine the number of drives to allocate as spares.

Additional tools to help manage storage

The DS4300 Express is supported by a variety of IBM Tivoli® software products, including IBM Tivoli Storage Manager and IBM Tivoli Storage Resource Manager, as well as many other third-party hardware and software products. These applications can add to the capabilities of the DS4300 Express by enabling backup and storage reporting.

The IBM TotalStorage Proven™ program is designed to identify and test many of these products for interoperability with the DS4300 Express and other IBM disk products. Products in this program have been tested to help reduce or eliminate time-consuming installation and support issues. For more information, please visit **ibm.com**/totalstorage/proven.

Service and support

The DS4000 series has a three-year hardware warranty. Additional services for hardware installation, DS4000 Storage Manager configuration and advanced storage management are

also available from IBM Global Services (IGS). IBM Support Line services can assist with using DS4000 Storage Manager, helping to enable customers to self-maintain their DS4000 system.

The optional DS4000 Service Alert and the new DS4000 Alert Manager services are designed to enable the DS4300 Express to quickly notify the IBM Support Center of problems when they occur, helping to reduce or eliminate the need for the customer to place a service call. This feature is capable of forwarding error alert messages (via e-mail) from DS4000 Storage Manager to IBM to help expedite diagnosis and repair of failed hardware and software problems.

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High-performance storage for the on demand world

The features of the DS4300 Express—including the turbo option—further enhance the functionality, flexibility and scalability of the DS4000 series. As a high-performance Fibre Channel storage system, the DS4300 Express is designed to enable fast, responsive applications that can help improve transaction rates and customer satisfaction.

The performance, capacity and data management and protection capabilities of the DS4300 Express can not only help address the storage needs of today, but also provide a base for continued growth to help meet future storage requirements. By combining these capabilities with a design focused on high reliability, manageability and affordability, the DS4300 Express offers a cost-effective storage system for the on demand world.

IBM TotalStorage DS4300 Express at a glance

Characteristics	
Configurations	Available in the following pre-defined configurations: Single controller with no HDDs: P/N - 1722-6LJ • DS4300 Express Midrange Disk • Short Wave SFP GBIC (2) • 1M Fibre Optic Cable (2) Dual controller with no HDDs: P/N - 1722-60K • DS4300 Express Midrange Disk • Short Wave SFP GBIC (2) • 1M Fibre Optic Cable (2) Dual controller with 10 HDDs: P/N - 1722-60J • DS4300 Express Midrange Disk • Short Wave SFP GBIC (2) • 2GB FC 73.4 GB/10K DRIVE (10) • 1M Fibre Optic Cable (2) Turbo with no HDDs: P/N - 1722-60L • DS4300 Express Midrange Disk • DS4300 Express Turbo Feature-IPO • Short Wave SFP GBIC (2) • 1M Fibre Optic Cable (2)
RAID controller	Single or dual active 2 Gbps RAID controllers
Cache	Single controller model: 256 MB Base dual controller model: 512MB total, battery-backed With turbo option: 2GB total, battery-backed
Host interface	2 or 4 Fibre Channel (FC) Switched and FC Arbitrated Loop (FC-AL) standard
Drive interface	Base single and dual controller models: 2 Gbps FC-AL With turbo option: Auto-sensing 1 Gbps/2 Gbps FC-AL
Supported drives	73.4, 146.8GB and 300GB 10K rpm drives 36.4, 73.4GB and 146.8GB 15K rpm drive 250GB 7200 rpm SATA (dual controller, Turbo feature)
Internal storage	Maximum: 4.2TB
Internal disk bays	Fourteen standard
RAID levels	0, 1, 3, 5, 10
Storage partitions	Single controller and base dual controller: 1 host group standard, upgradeable to 4, 8 or 16 storage partitions With turbo option: 8, upgradeable 16 or 64
Maximum drives supported	Single model: 14 FC drives Base dual model: 56 FC drives (using three DS4000 EXP710 Express Expansion Units) or 112 Serial ATA drives (using 7 DS4000 EXP100 Express Expansion Units) With turbo option: 112 FC drives (using 7 DS4000 EXP710 Express Expansion Units) or 112 Serial ATA drives (using 8 DS4000 EXP100 Express Expansion Units)
Disk drive ports	Two (dual controller/Turbo)
Fans and power supplies	Dual redundant, hot-swappable for dual controller models Single power supply for single controller model
Drive interface	2 Gbps FC-AL
Rack support	19-inch, industry-standard rack
Optional copy services	Dual—FlashCopy/VolumeCopy, Turbo—FlashCopy/VolumeCopy, Enhanced Remote Mirroring
RAS features	Concurrent firmware updates Hot-swappable disk bays Dynamic capacity expansion, dynamic RAID level migration Dynamic volume expansion, dynamic segment size migration Hot-plug redundant cooling fans Redundant power (dual controller)
Management software	IBM TotalStorage DS4000 Storage Manager versions 8.3, 8.4, 9.10 and 9.12
SAN support	Supported IBM FC switches and directors (product numbers 2005, 2006, 2109, 3534, 2031, 2032, 2034, 2042, 2061, 2062 and BladeCenter™)
Power requirements	100-127v AC or 200-240v AC
Warranty	3-year parts and labor warranty, next-business-day response; upgradeable to 24x7 support with 4-hour response

IBM TotalStorage DS4300 Express at a glance

Physical characteristics	
Dimensions	132.3 mm H x 482 mm W x 597 mm D (5.2 in x 19 in x 24 in)
Weight[3]	30 kg (66 lbs)
Supported systems[4]	For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the DS4300 Interoperability Matrix available at **ibm.com**/storage/ds4300. For availability dates, configuration options, and attachment capabilities, refer to: **ibm.com**/storage/ds4300. The DS4300 Express is supported only in rack installations. With optional features, up to three DS4000 EXP710 Express Expansion Units can be attached to the DS4300 dual controller enclosure for a maximum of 56 drives. With the turbo option feature, up to seven DS4000 EXP710 Express Expansion Units can be attached to the DS4300 Express enclosure for a maximum of 112 disk drives

For more information

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MB, GB and TB equal 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, where referring to storage capacity. Actual storage capacity will vary based upon many factors and may be less than stated. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology.

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[1] Base model (without turbo option) provides up to 400 MBps throughput.

[2] Base model (without turbo option) supports up to 56 fibre channel disk drives using three DS4000 EXP710 Express Expansion Units or 112 Serial ATA disk drives using eight DS4000 EXP100 Express Expansion Units. With turbo option: 112 fibre channel disk drives using seven DS4000 EXP710 Express Expansion Units, or 112 Serial ATA Disk drives using eight DS4000 EXP100 Express Expansion Units.

[3] Weight excludes disk drive modules (dual controller models only).

[4] For specific details and configuration availability, please visit **ibm.com**/eserver.express.

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